

Claims

- [c1] 1. A method of forming a gas dielectric with support structure comprising the steps of:
- providing a conductive structure in a wiring-layer dielectric;
 - forming a support connected to the conductive structure, the support including an area thereunder;
 - and
 - removing the wiring-layer dielectric from the area to form a gas dielectric.
- [c2] 2. The method of claim 1, further comprising the steps of:
- providing the conductive structure as a first interconnect; and
 - providing a second interconnect in spaced relation away from the first interconnect in the wiring-layer dielectric, wherein the support forms a bridge connecting the first interconnect with the second interconnect.
- [c3] 3. The method of claim 2, wherein the bridge is formed coplanar with a top surface of the first interconnect and the second interconnect.

- [c4] 4. The method of claim 2, further comprising the steps of:
- providing a via-layer dielectric layer;
 - providing the wiring-layer dielectric on the via-layer dielectric; and
 - removing a portion of the via-layer dielectric, wherein the gas dielectric surrounds the bottom of the first interconnect and the second interconnect.
- [c5] 5. The method of claim 1, wherein the support is formed coplanar with a top surface of the conductive structure.
- [c6] 6. The method of claim 1, wherein the support includes a dielectric material.
- [c7] 7. The method of claim 1, further comprising the steps of:
- providing a via-layer dielectric;
 - providing the wiring-layer dielectric on the via-layer dielectric; and
 - removing a portion of the wiring-layer dielectric, wherein the gas dielectric surrounds a portion of a bottom of the conductive structure.
- [c8] 8. The method of claim 1, wherein forming the support further comprises the steps of:
- forming a stopping layer on the wiring-layer dielec-

tric;
forming a sacrificial layer on the stopping layer;
selectively removing a portion of the sacrificial layer,
the stopping layer, and the wiring-layer dielectric for
placement of the conductive structure;
forming a vertical sacrificial spacer in the portion se-
lectively removed to surround a portion of the con-
ductive structure;
forming the conductive structure between the vertical
sacrificial spacer;
partially removing the conductive structure substan-
tially coplanar to a top surface of the sacrificial layer;
removing the sacrificial layer and a top portion of the
vertical sacrificial spacer; and
forming a support with the stopping layer and a ma-
terial on the vertical sacrificial spacer, wherein the
material is formed coplanar to a top surface of the
stopping layer and connects to the conductive struc-
ture.

- [c9] 9. A semiconductor device structure comprising:
- an underlying structure;
 - a conductive structure;
 - a support connected to and coplanar to a top surface
of the conductive structure, the support including an
area thereunder; and

a gas dielectric in the area and surrounding a portion of the conductive structure.

- [c10] 10. The device structure of claim 9, wherein the conductive structure includes a wire.
- [c11] 11. The device structure of claim 9, wherein the conductive structure includes a first interconnect.
- [c12] 12. The device structure of claim 11, further comprising:
a second interconnect in spaced relation away from the first interconnect on the underlying structure,
wherein the support includes a bridge connecting the first interconnect with the second interconnect.
- [c13] 13. The device structure of claim 12, wherein the gas dielectric surrounds a bottom of the first interconnect and the second interconnect.
- [c14] 14. The device structure of claim 9, wherein the support includes a dielectric material.
- [c15] 15. The device structure of claim 9, wherein the gas dielectric surrounds a portion of a bottom of the conductive structure.
- [c16] 16. A method of forming a gas dielectric with support structure comprising the steps of:
providing an underlying structure;

forming a via-layer dielectric on the underlying structure;
forming a wiring-layer dielectric on the via-layer dielectric;
forming a conductive structure in the wiring-layer dielectric;
forming a support connected to and coplanar to a top surface of the conductive structure, the support including an area thereunder; and
removing the wiring-layer dielectric from the area to form a gas dielectric.

- [c17] 17. The method of claim 16, further comprising the steps of:
 providing the conductive structure as a first interconnect; and
 providing a second interconnect in spaced relation away from the first interconnect in the wiring-layer dielectric, wherein the support forms a bridge connecting the first interconnect with the second interconnect.
- [c18] 18. The method of claim 16, wherein the conductive structure includes a wire.
- [c19] 19. The method of claim 16, wherein the support includes a dielectric material.

[c20] 20. The method of claim 16, further comprising the step of removing a portion of the via-layer dielectric, wherein the gas dielectric surrounds a portion of a bottom of the conductive structure.